

Office Action Summary

Application No.

10/663,079

Applicant(s)

BUCKLEY ET AL.

Examiner

Harry D. Wilkins, III

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24,31-35 and 43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-24 and 43 is/are allowed.
- 6) ☒ Claim(s) 31-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/633,665.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 March 2007 has been entered.

Means-Plus-Function Language

2. Amended claim 1 and new claim 43 include means-plus-function language, which has been interpreted as follows:

a. "means for passing a saline solution having a substantially constant chloride ion concentration through the electrolytic cell to produce a substantially constant chloride ion throughput" (claim 1), although not expressly defined in the specification, has been interpreted to mean structure which controls both the concentration of saline and flow rate of liquid to maintain the constant chloride ion throughput.

b. "means for adjusting the flow of chloride ions into the input solution to maintain a constant chloride ion throughput through the electrolytic cell" (claim 43), although not expressly defined in the specification, has been interpreted to mean a control system capable of maintaining a constant chloride ion throughput, such as by

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maintaining constant flow rate and constant chloride concentration, or by adjusting flow rate in response to measured conductivity.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Murakami et al (US 4,432,856).

Murakami et al anticipate the invention as claimed. Murakami et al teach (see figure 1) an apparatus for electrochemically treating a supply of aqueous salt solution (25) including a divided electrolytic cell having anode and cathode chamber, each having an anode or cathode, respectively, and input and output lines wherein the input line to the cathode chamber was provided with a flow regulator (22), the anode and cathode were connected to a source of direct current (inherently capable of operation at constant current) and an output line from the cathode chamber was connected to an input line of the anode chamber by way of a recirculation line.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 31-35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguti et al (US 5,445,722) in view of Broun, Jr et al (US 3,250,691) and Murakami et al (US 4,432,856).

Yamaguti et al teach (see figure 2) an apparatus for producing an output solution including an electrolytic cell (1), means for creating a solution of constant chloride ion concentration and passing it to the electrolytic cell (109), means for dispensing the output solution from the cell (115a). Yamaguti et al teach a power supply 23 for applying current across the anode and cathode to perform the reaction.

However, Yamaguti et al fail to teach that the power supply was capable of operating at constant current.

Broun, Jr et al teach (see col. 6) operation of an electrolytic cell to produce free chlorine in a cathode stream, where constant current was utilized.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the constant current source of Broun, Jr et al to the apparatus of Yamaguti et al because operation at a constant current would have provided a constant rate of production of products. One of ordinary skill in the art of electrolysis was aware that the rate of reaction in an electrolysis reaction was directly proportional to the current flowing according to Faraday's Law of Electrolysis.

However, Yamaguti et al and Broun, Jr et al fail to teach a catholyte recirculation line for feeding at least a portion of catholyte from the cathode chamber to the input line of the anode chamber.

Murakami et al teach (see figure 1 and cols. 5 and 6) that the product produced and the pH of the product can be controlled by adjusting the pH of the input anolyte by way of recirculating a portion of the catholyte to the input anolyte to control the pH.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a catholyte recirculation line to the apparatus of Yamaguti et al as suggested by Murakami et al for the purpose of providing additional control of the pH of the anolyte output solution.

Regarding claim 31, Yamaguti et al teach the divided electrolytic cell, the flow regulator on the cathode chamber input line, and Broun, Jr et al suggest the constant direct current power source. Murakami et al suggest the recirculation line for controlling the pH.

Regarding claim 32, since Yamaguti et al teach a desire (see col. 3, lines 50-56) to be able to control the pH of the output solution, it would have been obvious to one of ordinary skill in the art to have added an additional detector for determining the pH of the output solution to ensure it was within desired ranges.

Regarding claims 33 and 34, Murakami et al suggest control of the pH of the output anolyte by feeding a portion of the catholyte into the input line of the anode chamber. Thus, it would have been obvious to one of ordinary skill in the art to have provided a pump for moving the catholyte into the input line and to have controlled the amount of catholyte flowed by the pump by utilizing the pH meter of Yamaguti et al in order to have utilized a conventional feedback control loop for controlling the pH of the anolyte in the output line.

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Regarding claim 35, it would have been obvious to one of ordinary skill in the art to have provided a degassing unit in the recirculation line to have prevented any hydrogen gas produced at the cathode and dissolved in the catholyte from being transferred into the input line of the anode chamber.

Allowable Subject Matter

7. Claims 1-24 and 43 are allowed.
8. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach or suggest means for controlling **both** the flow rate **and** chloride concentration in order to establish a constant chloride ion throughput.

Response to Arguments

9. Applicant's arguments filed 18 September 2006 have been fully considered but they are not persuasive. Applicant has argued that

- a. Murakami et al cannot anticipate claim 31 since Murakami et al fail to teach a flow regulator and the structure cite by the Examiner (22) is not a flow regulator.

In response, the tank (22) cited by the Examiner operates as a flow regulator since it contained an orifice at its bottom for connection to an output line (23). The orifice operated to limit the flow rate leaving the tank (22), therefore, the apparatus of Murakami et al included a flow regulator as claimed.

- b. Yamaguti et al cannot be combined with Murakami et al because each reference teaches a different manner in which pH of the input anolyte was controlled.

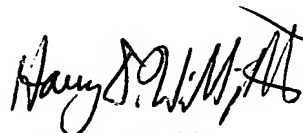
In response, although the two references use different methods to control a pH at a specific point in the apparatus, one of ordinary skill in the art would have been motivated to have utilized both methods to achieve better control of the pH.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw